

Hand Collection – Hand Harvest

1992

Seed seeking activities generated some beneficial public visibility with articles in local newspapers as well as increased volunteer activities. Private individuals, school groups and local organization donated valuable time collecting seed at sites surveyed in this study.

Volunteers made 638 collections of local ecotype prairie seed on approved and verified prairie remnants. Approximately 130 different native species were collected. Although these collections were usually quite small, they were vitally important for WNT's success for several reasons. These seeds were carefully collected and labeled according to species, collector, site, and date. This enabled us to develop production areas of seeds which were in short supply and to keep collections from various portions of our collection sites separate. It also allowed us to design planting mixes relative to specific conditions which exist on various areas in WNT.

Volunteers were also able to collect species that could not be obtained commercially because they take so much time and patience to harvest. We anticipate that volunteer collections will always be an important source of difficult-to-obtain seeds.

While volunteers were collecting seeds, they also experience first-hand the process of prairie restoration and reconstruction. They began to understand the joys and frustrations of rebuilding highly damaged systems and building natural communities in areas where all traces of the natural system has been obliterated, such as in a cornfield. In short, involving the public in seed collection is one of the most important things we do at WNT because the preservation of the larger resource is dependant on a grassroots understanding of valuation of their natural resources and a direct involvement with it.

1993

Another volunteer, Rayford Ratcliff, donated over 300 hours to WNT by combing local road ditches and cemeteries to locate prairie and savanna seeds to harvest. Upon verifying the locations and species, Mr. Ratcliff would hand-pick the seeds and collect them in pickle buckets that he attached to both sides of his belt. His visits to the Refuge office always revealed a smile and a car trunk full of bags of seed.

Approximately 100 species of grasses and forbs from prairie and savanna were collected by hand in 1993. Both machine and hand harvested seeds were extremely wet. We anticipate that we will have approximately the same amount of seed from harvests in 1993 as in 1992. Though we will probably have an equivalent amount of seed from this year's harvest, the quantity of individual species and the conditions of seed harvested is somewhat different that last year, again, due to the rainy season.

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Many wet areas were literally under water, ranging from a few days to several weeks; therefore they did not produce seed. Species growing in wet to wet-mesic areas, such as the prairie gayfeather (*Liatris pycnostachya*), generally did not produce viable seed as successfully as last year. Dry areas, on the other hand, produced abundant, plump seed, especially from species that bloomed from mid to late season. Scaley blazing star (*Liatris squarrosa*) and rough blazing star (*Liatris aspera*) were observed on one dry site in almost solid 20 foot bands (arranged relative to the topography) of healthy seed producing plants. Seed production for such species such as prairie gayfeather, occurring in set sites.

Some species of prairie plants apparently had low seed production throughout much of our local ecotype range and the poor success in seed set seemed more closely related to season of bloom than site moisture conditions. Many of these species bloomed in the first half of the growing season and a suspected cause of low seed production was low availability of pollinators due to the cool, wet season.

Seed predation appeared to be high in big bluestem on some of our harvest sites in 1993. Apparent insect damage occurred in the inflorescence and in the culm. In prairies affected by this condition, many inflorescences did not produce viable seed.

We are also concerned about the potential spread of big bluestem smut, a non-native fungal disease believed to have started in Iowa from plantings of seed that originated in Nebraska. This disease is ultimately fatal to affected plants; symptoms include occurrence of several shortened culms among taller culms. Eventually in successive years, no normal height culms occur and the plant finally dies.

Prairie Harvest Festival --- WNT staff and volunteers returned to the A.C. Morris Prairie on the afternoon and evening of September 19th for the 2nd Annual Prairie Seed and Feed. BBC Bluegrass band provided the entertainment during a pot-luck supper at nearby Mariposa County Park. WNT staff, volunteers and first time participants traveled to A.C. Morris Prairie to collect seed for restoration at WNT. The group of 30 participants enjoyed the event although wet and cool summer weather reduced the volume of seeds ready for harvest.

1994

Volunteers hand collected 105 prairie species. In 1993, volunteers collected 71 species.

1995

Possibly the most impressive Volunteer Program effort at WNT in 1995 was the Prairie Seed Collection Teams. Hours dedicated to seed collection totaled 1,350, a 19% increase

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from 1994. Participation in the collections jumped 25% from one year ago. One hundred ten people joined four Collection Teams that met weekly from September to November to hand-harvest prairie seeds from central-Iowa prairie remnants. Harvesters collected, recorded, dried, cleaned, and delivered seed to WNT on specific seed receipt dates held monthly. Seven Seed Collection Teams celebrated National Wildlife Week, October 10-14 with harvesting events. Over 400 students, K-post secondary, also worked to collect seeds from within refuge boundaries.

A database was used to track species, origin, collector's name, and weight of seed. Tetrazolium test results were recorded and used to indicate the amount of live seed. Planting prescriptions were developed based on live seed estimates.

Hand collected seed was available through volunteer seed collection efforts and by purchase. Species, origin, collector's name, and weight of hand harvest seed were also tracked. Through bulk harvest provided the majority of grass planted, and served as a matrix to which hand collected species were added, hand collections provided additional diversity unavailable in bulk harvests.

Overall, the condition of the prairie seems to be improving in quality over the past three years. Rough dropseed (*Sporobolus asper*) has increased in density and now is forming a substantial graminoid matrix along with other graminoid species. Forb populations in general seem to be expanding and increasing in vigor. This year was an especially floriferous year for 5 species of forbs on the prairie including pale purple coneflower (*Echinacea pallida*), whorled milkweed, black-eyed Susan (*Rudbeckia hirta*), flowering spurge (*Euphorbia corollata*), and compass plant (*Silphium laciniatum*). This prairie was an important seed source for all of the species mentioned except the flowering spurge. Just prior to seed collection, drought became so severe that all flowers and developing fruit became shriveled and blackened and either aborted or did not mature.

This year, WNT took possession of a sedge meadow located in the southern section of the Refuge. Heavy grazing, drainage, and invasion by reed canary grass has severely diminished the area, but several sedge meadow species are abundant on the site and restoration potential appears to be good. This became an important volunteer collection site in the fall for blue vervain (*Verbena hastata*), an important species in early establishment of prairies.

1996/7

In 1996 an enthusiastic core seed collection cadre of over 35 volunteers harvested over 65 pounds of native seed representing 124 species from 40 sites within our local ecotype zone. The total weight of seed harvested by volunteers climbed to over 140 pounds in 1997. There were over 140 species collected from 61 sites by 67 regular volunteers!

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Scores more volunteers assisted with the off-site seed collection efforts, and hundreds of school children harvested prairie seeds from sites on the Refuge.

1998

Volunteers are critical in introduction of plant species diversity to the Refuge, because machine harvest only result in species that are mature at the time of harvest, usually in fall. In addition, many species are missed because of limitations of machines. We are deeply grateful to the many volunteers who assisted us in seed collection from remnant prairies. Forty-three volunteer seed harvesters visited 37 sites during harvest season in 1998 to collect nearly 78 pounds of seed of 121 native species! Scores more volunteers assisted with the off-site seed collection efforts, and hundreds of school children harvested prairie seeds from site on the Refuge.

Volunteer Assistance – A special volunteer, Rebecca Hecht, provided several months which totaled nearly 40 hours per week while she worked in the evening to support her habit of ecological restoration at the Refuge. Rebecca is a talented biologist gaining experience at the Refuge and aspiring to eventually become a wolf biologist. The staff all wish Rebecca the best!

1999

Seed Harvest – A team of approximately 100 volunteers assisted in collecting seed of 136 species of forb, sedge, and grass seed on 51 sites, as well as collections on the Refuge by students involved in environmental education programs. These collections represent species that characterize tallgrass prairie and savanna ecosystems but that are poorly represented on the Refuge because they are available in limited quantities. In addition, some of these species are rare or seem to need a matrix of prairie species in order to establish and thrive.

Hand collection was focused on obtaining seed from spring and summer as well as the usual fall seed collections, though early season seed collection tends to be more labor intensive because low growing spring blooming species are quickly obscured by the increasingly tall and profuse summer and fall prairie biomass.

In addition to focusing on collecting throughout the growing season, seed pickers were asked to obtain seed from as many gene pools as possible within approximately 20 miles of the Refuge in order to develop a diverse gene pool source for future reproduction plots. This increased travel time for volunteers who needed to travel from site to site to collect seeds of several species as they ripened. As a result, our cleaned seed amount was lower

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than in past years, but included species that are difficult to obtain and collect in our area such as the prairie violet (*Viola pedatifida*), prairie lily (*Lilium philadelphicum*) and yellow star grass (*Sisyrinchium campestre*).

A small amount of prairie or slender blush clover (*Lespedeza leptostachya*), a species listed on the Federal Endangered and Threatened Species List as threatened, was also collected for future germination and reintroduction studies.

Seed cleaning equipment purchased this year included a seed sieve shaker and a Dakota blower (air column). Both of these have increased the ease of seed cleaning of small lots of seed. Because volunteers enjoy using these pieces of equipment, we are able to attract more volunteers to clean seed at the Refuge. As a result, more seed is cleaned to a greater degree in less time.

During the summer of 1999, three nine week internships for college students were sponsored by the Friends of the Prairie Learning Center. Work of the students focused on ecological restoration and research at the Refuge, but included environmental education and operations-type work as well. Interns participated in the following activities:

Planted 990 prairie violets (*Viola pedatifida*) in 10 plots (5 bison area, 5 south of PLC) and provided follow-up care of plantings as a part of the regal fritillary butterfly reintroduction project

Participated in the control of exotic species including Canada thistle (*Cirsium arvense*), musk thistle (*Carduus nutans*), bull thistle (*Cirsium vulgare*), tall thistle (*Cirsium discolor*), reed canary grass (*Phalaris arundinacea*), and sweet clover (*Melilotus alba* and *M. officinalis*).

Propagated prairie plants from seed and from vegetative cuttings, transplanted seedlings to 8-inch containers, and transplanted several species of greenhouse grown plants to prairie plantings. Learned and performed greenhouse care including fertilization, and kept records of care.

Collected prairie seeds in prairie remnants and dried and processed seed. Interns participated in developing the 1999 seed inventory, also learned and performed techniques of prairie interseeding.

Assisted in planning and installing a misting system in the propagation greenhouse.

Provided leadership by interpreting the ecology of the Refuge and by leading stewardship activities during two Friends Stewardship Saturdays, and during Buffalo Days

Led teachers participating in Iowa Corps in stewardship activities

Participated in breeding bird point-counts with Refuge staff member, Craig Olawsky.

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2000

Ecological Outreach and Information Sharing - Development of Local Ecotype Zones for Minnesota and Iowa - A map of local ecotype seed harvest zones for Iowa and Minnesota was begun by Drobney in 1999 upon request from the Regional Office. Such zones could be used to guide development of local ecotype projects throughout these two states. Within a year, the Northern Tallgrass Prairie Ecoteam developed a priority that stated that within the ecoregion, all FWS programs would become independent of non-local ecotype seed within 5 years. The map and guidelines that Ms. Drobney developed to explain intended use of the map were unanimously adopted by the ecoteam for use in establishing cooperative project areas in the Northern Tallgrass Prairie Ecoregion.

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In the final map, entitled “Ecotype Zones for Minnesota and Iowa”, there are 9 distinctive ecotype zones, with a caveat that land immediately associated with major riverine systems such as the Missouri, Mississippi, and Minnesota Rivers, be considered separate ecotype zones. Each of the major zones are divided into at least two subdivisions, because though there are broad ecological similarities within each of the zones, there are likely genetic differences due to the relatively broad geographic coverage. This is especially true in zones broadly oriented north and south because latitudinal differences are directly related to climatic differences. Climate including daylength, rainfall, and temperature, critically affects genetic characteristics of plants.

A document defining local ecotype and including definitions, rationale, and common-sense guidelines for use were developed to explain intended application of the information on this map. A **local ecotype zone** is defined as a geographic area with generally similar environmental characteristics and plant and animal species associations, and within which genetic characteristics are likely to be similar.

The zones on the map are intended to be used as a general guide, not applied as a rigid rule. For the purposes of prairie seed collection and ultimate planting, local ecotype zones are constructed broadly enough to accommodate large or general projects, but narrowly enough to express ecological uniqueness.

Use of ecotype zones is subject to decisions made on a case-by-case basis by Project Leaders and land managers within the area. In some cases, land managers may design a project local ecotype zone that is much more restrictive than this map indicates, for example, when a parcel of farmland is purchased near a high quality prairie and will be restored to prairie. In other cases, the project local project ecotype zone could include portions of two or more ecotype zones indicated on this map. One reason could be because the project is near or across the boundary of three zones. Portions of all three zones may be appropriate in the project local ecotype zone.

This map is currently being used by the FWS in the Northern Tallgrass Prairie Ecoregion to develop cooperative project areas to share resources and effort to develop specific ecotype zone seed production. Seed nurseries that will produce single species harvests, and multi-species plantings that will produce somewhat diverse harvests are being planted in several areas from seed originating from local prairie remnants.

In addition, the Iowa DNR, noting the FWS leadership in this arena, has decided to adopt the goal of becoming independent of non-local seed within 5 years. Jim Munson, of the Iowa Private Lands Office, spearheaded the cooperative effort between FWS and DNR and at a meeting he facilitated and that was held at the Neal Smith NWR, Iowa DNR staff present unanimously agreed to adopt the same ecotype zone map that the Northern Tallgrass Prairie Ecoteam had adopted. The Iowa DNR is now a strong partner with Iowa FWS team members in our ecoregion. Information is being shared intensively, as is equipment and seed. In some cases, different species are being grown in different localities to facilitate mutual seed needs.

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Additional inquiries have been made from agencies and organizations outside Minnesota and Iowa, who have been interested in development of similar maps for their areas.

As several years of restoration and reconstruction efforts on the Refuge have begun to bear fruit, the Friends of the Prairie Learning Center sought to become more directly involved in the restoration process. The site selected was a 20 acre parcel along the east end of the Tallgrass Trail. Work on the Friends' Prairie was initiated in 1998 and has since become a premier restoration site.

On the second Saturday of every month, the Friends of the Prairie Learning Center held a stewardship event at the Refuge led by a member of biology staff. Participation ranged from 5 to 50 people who usually worked from 9:00 a.m. to approximately 1:00 p.m. The activities varied based on the time of year and included exotic tree cutting/removal, exotic invasive removal, native seed collection, seed cleaning, seed sowing, gully repair, and orchid labeling. These fun work days give Friends the opportunity to understand the challenges of ecological restoration of the Refuge first hand, and not only assists the restoration process, but provides a foundation for interpretation of the Refuge to the public they address on our behalf.

Volunteer Seed Collection. From spring through fall, seed was collected by hand at surrounding prairies by volunteers and other stewardship groups. Over 100 different species were collected from 32 sites, 5 of which were on the Refuge. Over 100 lbs. (nearly 1600 oz.) of seed were cleaned after collection (some of this weight includes partially cleaned seed). This volume of seed could have cost around \$25,000 if purchased through commercial dealers. However, many of the species are not commercially available, making collected seed invaluable. These collections represent species that characterize tallgrass prairie and savanna ecosystems but that are poorly represented on the Refuge because they are available in limited quantities.

This year we obtained a significant number of species that have never before been harvested for the Refuge or that are rarely found because of habitat destruction, including: Azure aster (*Aster azureus*), Flat-topped aster (*Aster umbellatus*), Tuberous Indian Plantain (*Cacalia tuberosa*), Marsh Marigold (*Caltha palustris*), Gray's sedge (*Carex grayi*), Hop sedge (*Carex lupulina*), Palm sedge (*Carex muskingumensis*), Turtlehead (*Chelone glabra*), Yellow flax (*Linum spp.*), Violet Wood Sorrel (*Oxalis violacea*), local ecotype Switchgrass (*Panicum virgatum*), Wood Betony (*Pedicularis canadensis*), Prairie phlox (*Phlox pilosa*), Mad-dog skullcap (*Scutellaria lateriflora*), Blue-eyed grass (*Sisyrinchium campestre*), and Bird's foot violet (*Viola petadifida*).

Outstanding volunteers trained in plant identification and collection techniques organized seed collection teams. Others with skills in seed processing formed seed cleaning teams. Laurie and Dan Fennimore served as Seed Collection Team Leaders for several sites in Jasper and Polk Counties. Their dedicated team has produced a large amount of hand collected seed for the Refuge. In addition to seed collection, they have located privately owned remnants, obtained permission from the landowners to collect

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seed for the Refuge, and have become active ambassadors for the long-term preservation and stewardship of these remnants.

LaVerne Collister, continues to provide extraordinary service as a Seed Collection Team Leader, with 9 years of experience with the Refuge! He was the first Seed Collection Team Leader and has not only led seed collection efforts, but made educational identification and information cards to inform his team. This team goes above and beyond the call of duty by not only collecting seeds, but by spreading some of their collected seed on degraded portions of the collection sites which through the years, are becoming more diverse.

All of these devoted individuals and many more function as vital sources for future plant diversity in our reconstructed prairie and have helped us move closer to producing our own supply of seed for harvest. These folks have donated an amazing amounts of time and effort to and deserve a standing prairie ovation for their contributions to the Refuge.

Friends' Biological Interns - The Biology Department had the good fortune of having two dedicated and hard working interns, sponsored by the Friends. Ron VanNimwegen, a student at Iowa State University and Joe Heffron, a student at Drake University, were an integral part of biological operations over the summer and participated in all department activities, including invasive species control (both earned non-commercial pesticide applicator certification); hand seed collecting: needle grass (*Stipa* sp.) and blue-eyed grass (*Sisyrinchium campestre*); seed cleaning; butterfly survey transect layout; and bluejoint grass (*Calamagrostis canadensis*) potting.

2001

Volunteers Karen Balmer and Lynn Huebler worked through the summer on a project to concentrate plant diversity and accelerate ecological development in an area of high visibility to the public near the Prairie Learning Center. As a result, they transplanted a variety of forbs and some grasses from the greenhouse to an area adjacent to the Overlook Trail. Karen and Lynn took great care in the transplantation of the seedlings, placing stakes near each plant and monitoring the condition. In addition to transplants, they collected seed from appropriate prairie seed sources and interseeded their area. All activities and seed/plant sources and numbers or amounts planted are carefully documented.

Monthly Biology Stewardship Activities - The Refuge Friends group holds volunteer stewardship activities on the second Saturday of each month and a smaller yet equally dedicated group of volunteers turns out on the last Thursday. The Second Saturday

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stewardship days are focused on the Friends' Prairie area of the Refuge which provides the Friends with an opportunity to develop a sense of ownership and responsibility for a piece of the Refuge. The work days also serve as an educational and recreational connection to the reconstruction process. The Second Saturday stewardship days have proven to be effective tools for harnessing the power of a dedicated work force to accomplish Refuge needs and goals. Though a crew of 6 to 60 people of all ages is possible, a dedicated core of regular attendees helps coordinate activities efficiently with Refuge staff. Their knowledge of Refuge needs and goals allows them to work more independently and accomplish more.

The Thursday evening events were requested by Refuge volunteer Jonathan Yentis as an alternative time for those not able to regularly attend the Saturday events. We also try to have a member of the staff take part to incorporate an educational program related to the work to be performed. Fewer volunteers are able to attend, but a smaller group allows us to interact more personally with them and increase the educational value of the experience. Many of those who attend the Thursday evening programs also attend the Saturday events and they have been able to assume leadership roles for less experienced volunteers.

Some of the efforts for which the volunteers have played a key role include seed collection and processing, invasive species removal, brush clearing, and bluejoint grass potting. These fun and educational events have become a focal point for volunteer activities.

Iowa DNR's Local Ecotype Seed Production Development Assistance - Project Leader Nancy Gilbertson, and Biologist Pauline Drobney provided guidance and cooperation in development of the Iowa DNR local ecotype seed production program by participating in two meetings with the Iowa DNR, Iowa Department of Corrections, and other cooperators to discuss methods of prairie seed increase and appropriate sources and harvest of seed. Ms. Drobney provided continued consultation to DNR staff and to the Iowa Department of Corrections Greenhouse Caretaker as a project to propagate seeds collected from high quality prairies by inmates progressed.

In addition to advice and information, the Refuge provided lab space and made seed cleaning and scarification equipment available to the DNR for preparing a few small selected seed lots for germination procedures. All seed handled by DNR staff in Refuge facilities came from the NSM local ecotype zone. In return, DNR staff provided small lots of seed for Refuge propagation purposes. This seed represents new gene pools for the Refuge propagation program.

School groups also aid in donating time and energy. Sixty school groups donated over 5,000 hours collecting seeds, cleaning seeds, and removing brush.

2002

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Volunteers and staff hand harvested more than 54 pounds of native prairie seed this year. The number of people involved in harvesting seed is hard to pinpoint as groups harvesting, such as school groups, are listed only by organization and not the individuals participating, but the total must certainly be well into the hundreds. Sheer numbers of participants on the Refuge allow them to harvest larger quantities of seed than collectors off-refuge. However, a dedicated cadre of volunteer seed collectors continues to harvest rare seed from prairie remnants, primarily within 20 miles of the Refuge. A major portion of this seed is harvested by seed teams led by seed team leaders Laurie and Dan Fennimore (Polk and northwestern Jasper Counties), and LaVerne Collister (Northern Jasper County). Individuals and groups on these teams assist in harvesting from several prairie remnants that harbor seed of rare or difficult-to-get species that are currently unavailable on the Refuge. Seed cleaning team leader, Jonathon Yentis, spends many days working with others to get an estimate of the amount of seed harvested by hand. Volunteer Erma Selser continues to efficiently enter data about each harvest in the seed database for use in developing seed prescriptions. Seed is then stored in our environmentally controlled seed room or stratified in refrigerators for use in plantings in the field or greenhouses. Greenhouse grown plants are used in production plot development to augment diversity in general plantings and for special high-visibility areas. Though it is impossible to precisely estimate the number of seeds collected, 81 species of native prairie seed were collected from at least 44 sites. The contribution to increasing plant species diversity on the Refuge cannot be overstated.

Every second Saturday of the month, a group of volunteers met to do stewardship related to the Friends of the PLC Prairie area. This year, groups of 6 to 60 people met to harvest, clean, and plant seeds, to plant plants, enhance prairie violet plot perimeters with nectaring plants for regal fritillaries, plant sedges, propagate plants, establish production plots, cut woody species, and participate in seminars. All in all, great fun was had and lots of work done. This weekend event is a convenient way for people to drop in and work and have fun with us doing ecological restoration, without feeling that they have to commit to a certain number of hours.

2003

Hand collection by volunteers and school groups on the refuge was excellent this year. Samples of fields being considered for machine harvest indicated that some fields were much more appropriate for harvest than others even amongst burned areas. Our lowland fields seemed to be producing a lower amount of seed. Canada wild rye seemed to have plump filled seeds, though big bluestem seemed less productive. Indian grass and little bluestem were generally unchanged from previous years.

Prairie Rescue Day and fall was the perfect time to do stewardship to restore prairies. Below coordinated 113 volunteers who showed up to cut and remove willows from the

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prairie, collect seeds from our production plots, and clean seeds in our labs. Drobney prepared a summary of ecological restoration and refuge significance, and Charland prepared a brief summary of the grassland bird species commonly seen at Neal Smith NWR for inclusion in a Field Guide to the prairies of the Midwest.

2004

The entire staff made an outing to the Coneflower Prairie to collect blue-eyed grass seed. Staff was able to collect a substantial amount of seed which establishes quickly and serves as a good “healer” plant for restored prairies.

Boot and Hager prepared for the machine seed harvest which began in late September. In only four days, they were able to harvest 6,300 bulk pounds of grass and forb seeds, WOW! NICE JOB! Boot started to contour terraces and roadsides of old crop fields to give the restoration areas a more even flow from the road into the prairie. Good coordination of hand collection between Public Use and Biology resulted in a very hefty seed collection, even adding a couple of new species to the collection list including nimblewill, obedient plant and foxtail dalea. The seed lab became a very active and busy place and the huge influx of seed was a result of dedicated staff, volunteers and the simple act of working together to accomplish a worthy task.

The YCC crew built a butterfly garden with 1100 square foot brick walkway, benches, rock wall, boulder and a “puddle” for the butterflies to drink from; cleared approximately three miles of fence; surfaced part of a public use trail with wood chips and built a boardwalk over a wet area; cleared invasive species from prairie plantings and planted seedlings; harvested seed; removed non-native plants from future harvest sites; and cleared brush and trees from prairie remnants, plantings and fence lines. They also aided in the maintenance of the Refuge by litter removal, cleaning offices, washing vehicles and cleaning storage areas and sheds (photos 62 – 66).

2005

Favorable weather has permitted continued seed collection by volunteers, Biology and EE staffs. Relatively large quantities of hand collected seed have been brought in and are actively being cleaned by several volunteers and refuge staff. It has been an especially well coordinated effort this year!

February 2005

For the first time in refuge history, ALL seeds collected in the past growing season have been cleaned and are planting-ready by the end of February! A large volume of seeds of up to 150 species is typically collected by volunteers and staff. Seed is typically at least

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partially cleaned to estimate amount sown for seed prescription building, monitoring, and research. Credit goes to the incredible teamwork among departments on staff at NSM, and to many dedicated volunteers.

June 2005

Biology staff and interns cut sweet clover, stratified seed for id cards, pressed plants and made identification cards for thistle research project, and collected blue-eyed grass from Coneflower Prairie.

July 2005

Biology program work performed by Krueger, Welsh, Drobney. Assistance was provided in some tasks by other staff members including Burrignt,

Collected spiderwort, prairie violet, sedge seed

Transplanted white prairie clover, switch grass, white indigo, butterfly milkweed and prairie dropseed from germination trays to conetainer trays

Laminated pressed seedling ID cards for Thistle Suppression Research Project

Assisted in planting and development of butterfly garden.

Assisted Murray in development of burn pile locations in preparation for Calvinist Cadet group project (Severson and Drobney)

August 2005

Harvest of sedges and late summer ripening seeds continues.

September 2005

Seed collection is in full swing in production plots, and in plantings on the refuge. Seed production is apparently good on many forbs. Those that were blooming or in fruit during June, however, are in poor condition. Pale purple coneflower is an example of that, with unfilled seed dominant in most heads already collected. Drobney is providing guidance in identifying ripe seed in high priority species for collection. Krueger and Murray are leading crews in seed collection. Stewardship Saturday provided person power to collect seed.

2006

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June 2006

Seed collection began to pick up this month. Muerdter and Mills monitored the prairie violet seeds at the production plots and collected seed as it ripened. Mills, Muerdter, and Viste-Sparkman collected blue-eyed grass, panic grass, and Bicknell's sedge from Buzzard Head and Coneflower Prairie. Murray and volunteers collected a record amount of blue-eyed grass seed at Buzzard Head for the Second Saturday stewardship.

On June 21, Drobney, Viste-Sparkman, and Volunteer Yentis encountered two blooming Green Milkweed (*Asclepias viridiflora*) plants at Buzzard Head. These are the first of this species identified on the Refuge. The plants were later flagged and Muerdter began monitoring the plants as the seeds ripen so they can be collected.

Volunteers were very active in June contributing over 1500 hours of service. The bookstore enjoyed 100 percent coverage with volunteers working over 300 hours. The month started with a great Second Saturday Stewardship day on the 10th. A crew of seven volunteers joined volunteer coordinator Al Murray to harvest seed at the Buzzardhead site. Over 50 grams of blue-eyed grass seed were collected -- a record amount for this species on the refuge. The Adopt-a Trail and Adopt-a-plot programs were active with over 150 hours of work recorded. We welcomed intern Aaron Nass to the refuge, Aaron has traveled from Virginia and is donating his time and energies while learning about our restoration efforts.

July 2006

Seed harvesting time is here. Volunteers and staff collected seed off of the production plots as well as various places around the Refuge. Intern Muerdter regularly checked prairie violets in the production plots and collected pods as they matured. She also weeded the violet plots that were beginning to get overrun. She collected other seed from the prairie, such as spiderwort and sedges. A class from DMACC collected seed at Coneflower Prairie.

August 2006

Seed collection season is in full swing, with several volunteers collecting seed at off-refuge sites. Enthusiastic volunteer Kim Anderson-Cornick is coordinating volunteers for this effort. Most of the seed has been collected from the production plots.

September 2006

The Volunteer program enjoyed a great month in September with volunteers donating over 2000 hours of time. This effort capped off a solid year for the program that saw over 21,000 hours of volunteer service. With the arrival of autumn most activity was focused on stewardship. Individuals, groups and schools donated over 1300 hours performing a variety of tasks to include Adopt-a-trail, Adopt-a-Plot, seed harvest, seed cleaning and butterfly tagging.

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October 2006

A class from DMACC-Newton campus collected seed from compass plant and obedient plant on Oct. 5.

Viste-Sparkman gave a brief overview of the refuge to a Field Biology class from DMACC-Newton campus on Oct. 5. The class then collected compass plant and obedient plant seed.

November 2006

Murray, Eicke, and Costello collected *Dalea leporina* seed from Highpoint unit before it was burned.

2007

June 2007

Two YCC enrollees from the local Prairie City community began their eight-week tour of duty. Nick Allan, STEP, will be the YCC coordinator with Krueger overseeing projects. Fence removal, fence building, weeding, planting, seed collection, cleaning, and painting are just few of their projects.

August 2007

Volunteers had a busy month here at Neal Smith NWR. A dozen volunteers joined Volunteer coordinator Al Murray to harvest seed at Coneflower unit for second Saturday Stewardship on the 11th. Adopt-a-trail and Adopt-a-plot volunteers remained committed contributing over 250 hours of volunteer time

September 2007

Bookstore volunteers led the way contributing nearly 300 hours of volunteer time during the month of September. On the 8th a dozen volunteers joined volunteer coordinator Al Murray and Bio Tech Rick Hager to harvest seed for Second Saturday stewardship activities. Murray and a small group harvested from sites at Coneflower prairie and High Point. Hager and volunteers collected at the production plots. Volunteers are now also working in the seed lab to clean and process harvested seed.

October 2007

The seed lab became a busy place during October. Viste-Sparkman led the Des Moines Founders Garden Club volunteers in seed collection as part of the Partners for Plants

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program. Hager led a group from DMACC in seed collection for Ding Darling Day. School groups and other volunteers also gathered seed. Several volunteers and school groups worked on seed cleaning, and volunteer Yentis catalogued cleaned seed.

The refuge was host to 125 volunteers who participated in this year's J.N "Ding Darling" prairie rescue day on October 13th. Murray, Groom, Hager, Krizman & Viste-Sparkman worked with different groups on projects around the refuge. These included Search and Destroy of *Sericea Lespedeza*, construction of brush piles, the collection of native prairie plant seed and the cleaning of seed in the seed lab. At the conclusion of activities participants enjoyed bison burgers sold by the Johnston Kiwanis.

November 2007

Seed collecting and cleaning continued during November.

2008

June 2008

The first seeds of the season, blue-eyed grass, were collected at Coneflower Prairie on June 25.

August 2008

Volunteers, interns, and staff continued collecting seed on the refuge.

Volunteers stayed busy here at Neal Smith National Wildlife Refuge. Bookstore volunteers led the way with 266 logged in. Work continued on the Adopt-a-Plots as well as in the Butterfly Garden. Second Saturday Stewardship on the 9th saw eight volunteers working with Rick Hager collecting seed.

September 2008

Seed collection kicked into high gear in September as school groups resumed stewardship activities and many species began ripening. By the end of the month most of the counter space in the lab was full of trays of seed. Turnis collected seed from some of the remnants, and Hager led volunteers in seed collection on Second Saturday. Viste-Sparkman identified ripe seed and locations to be targeted for collection.

Viste-Sparkman placed orders for seed from Diversity Farms and Allendan.

Hager and Viste-Sparkman identified and prepared a plot in front of the bus loading area that was planted by St. Joseph's Catholic School on Sept. 29. The plants all came from

Hand Collection – Hand Harvest

seed collected at Edge prairie, and will be a seed collection site for school groups in the future.

Viste-Sparkman and Jonathan Yentis conducted training in seed collection and cleaning protocols for staff members.

On Saturday September 27 Volunteers joined Vol. Coordinator Al Murray to collect seed from various sites around the refuge in observation of National Public lands Day. Seed was collected from High Point and the New Production plots.

October 2008

Students, volunteers, and staff collected seed at every opportunity during October. The seed lab is full, with a diversity of species collected. Viste-Sparkman coordinated with Visitor Services staff to identify seed to collect and clean. Viste-Sparkman, Lange, Murray, Day, and Janice Bengsten led volunteers in seed collection for Ding Darling Day.

Eighty volunteers largely scout groups, joined Second Saturday Stewardship volunteers and staff to observe J.N “Ding” Darling Day here at the refuge on the 11th. Participants harvested seed from a number of sites around the refuge as part of the fall prairie rescue day.

October was a huge month for the volunteer program here at the Neal Smith N.W.R. with Volunteers contributing over 2500 hours of service. 300 stewardship hours were donated by the participants of J.N “Ding” Darling Day alone. The School stewardship programs contributed 1800 volunteer hours with Students performing tree mapping, stream monitoring along with harvesting and cleaning seed in the seed lab. It truly was a great start for the new FY.

November 2008

Seed collection and cleaning continued through November. Over 116 lots of seed have been cleaned and cataloged compared to 39 lots at this same time last year.

2009

June 2009

June was a busy month for the volunteer program. Bookstore volunteers led the way with nearly 300 hours contributed. They did a commendable job adjusting to the increased visitor flow. Volunteers recorded nearly 500 hours between Adopt-a Trail program, the butterfly garden, seed collecting & Monarch monitoring program. Seeds of Success volunteers collected blue-eyed grass the first seed of the season.

Hand Collection – Hand Harvest

July 2009

Biology interns and the YCC crew collected seed from sedges and other species. Volunteers also participated in seed collection. Sedges are a major component missing from the prairie restoration effort as commercial seed is almost nonexistent. It is a major component of the bison diet.

Volunteers were very busy here at the refuge in July. Bookstore volunteers contributed nearly 300 hours of time providing information about the refuge to visitors and operating the bookstore. Adopt-a-trail volunteers logged over 100 hours fighting invasive species along the overlook trail. Second Saturday stewardship day on the 11th found a half dozen volunteers collecting sedges and spiderwort in the Highpoint unit. There were no less than 4 large stewardship groups working with ranger Al Murray pulling sweet clover and Queen Anne's lace along the overlook trail. About eighty youths representing groups from Silos and Smokestacks, Ankeny, Pleasant Hill & Waukee Youth in Parks programs joined in the fight against the weeds!